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Forskning

Ljud innehåller energi som kan generera krafter på mikroskopiska föremål som blodkroppar och biologiska nanopartiklar. Min grupp studerar fysiken hos ultraljudsvågor som interagerar med vätskor och mikroskopiska objekt. I samarbete med biologer och biomedicinska forskare bygger vi instrument för att separera celler och nanopartiklar med ultraljud.

Anställning

Universitetslektor

Avdelningen för biomedicinsk teknik
Lunds universitet
Lund, Sverige
2015 sep. 21 → present

Universitetslektor

Acoustofluidics group
Lunds universitet
Sverige
2017 juni 12 → present

Principal Investigator

NanoLund: Centre for Nanoscience
Lunds universitet
Lund, Sverige
2022 mars 30 → present

Profilområdesmedlem

LTH profilområde: Teknik för hälsa
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2022 juni 28 → present

Profilområdesmedlem

LTH profilområde: Nanovetenskap och halvledarteknologi
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2022 aug. 30 → present

Profilområdesmedlem

LTH profilområde: Avancerade ljuskällor
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2022 sep. 13 → present

Profilområdesmedlem

LU profilområde: Ljus och material
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2023 jan. 1 → present

Forskningsoutput

Configurable thermoacoustic streaming by laser-induced temperature gradients

Martens, F., Qiu, W., Jakobsson, O., Cierpka, C., Ehn, A. & Augustsson, P., 2025 feb. 18, I: Physical Review Applied. 23, 12 s., 024043.

High-energy-density acoustofluidic device using a double-parabolic ultrasonic transducer

Corato, E., Jakobsson, O., Qiu, W., Morita, T. & Augustsson, P., 2025 feb. 12, I: Physical Review Applied. 23, 10 s., 024031.

Two-Step Acoustic Cell Separation Based on Cell Size and Acoustic Impedance—toward Isolation of Viable Circulating Tumor Cells

Magnusson, C., Rezayati Charan, M. & Augustsson, P., 2025, I: Analytical Chemistry. 97, 4, s. 2120-2126 7 s.

Sound to guide cells

Augustsson, P., 2024 okt. 9.

Transient buildup and decay of thermoacoustic streaming

Augustsson, P., 2024 aug. 14. 2 s.

Two-step acoustofluidic cancer cell enrichment

Augustsson, P., 2024 aug. 14. 2 s.

Label-free separation of peripheral blood mononuclear cells from whole blood by gradient acoustic focusing

Alsved, J., Rezayati Charan, M., Ohlsson, P., Urbansky, A. & Augustsson, P., 2024 apr. 16, I: Scientific Reports. 14, 1, 12 s., 8748.

Acoustic Enrichment of Heterogeneous Circulating Tumor Cells and Clusters from Metastatic Prostate Cancer Patients

Magnusson, C., Augustsson, P., Undvall Anand, E., Lenshof, A., Josefsson, A., Welén, K., Bjartell, A., Ceder, Y., Lilja, H. & Laurell, T., 2024, I: Analytical Chemistry. 96, 18, s. 6914-6921

Acoustic enrichment of heterogenous circulating tumor cells and clusters from patients with metastatic prostate cancer
Magnusson, C., Augustsson, P., Undvall Anand, E., Lenshof, A., Josefsson, A., Welén, K., Bjartell, A., Ceder, Y., Lilja, H. & Laurell, T., 2023 dec. 4, medRxiv.

Acoustophoretic Characterization and Separation of Blood Cells in Acoustic Impedance Gradients
Rezayati Charan, M. & Augustsson, P., 2023 aug. 25, I: Physical Review Applied. 20, 2, 16 s., 024066.

Acoustofluidic Three-Dimensional Motion of Suspended Cells at Near-Zero Acoustic Contrast in Homogeneous Media
Rezayati Charan, M., Berg, F. & Augustsson, P., 2023, I: Physical Review Applied. 19, 1, 014046.

Acoustophoresis enriches tumor cell clusters in blood of patients with prostate cancer
Magnusson, C., Augustsson, P., Undvall Anand, E., Lenshof, A., Josefsson, A., Welén, K., Bjartell, A., Olsson, A. Y., Lilja, H. G. & Laurell, T., 2023.

Acoustophoresis enrichment of tumor cell clusters in blood of patients with metastatic prostate cancer
Magnusson, C., Augustsson, P., Undvall Anand, E., Lenshof, A., Josefsson, A., Bjartell, A., Olsson, A. Y., Lilja, H. G. & Laurell, T., 2023, (Unpublished).

Freeze Frame Imaging- a new imaging technique for fast dynamics particle tracking
Jakobsson, O., Rossi, M., Cierpka, C. & Augustsson, P., 2023.

High-power acoustofluidics driven by line double-parabolic-reflectors wave-guided high-power ultrasonic transducer
Corato, E., Qiu, W., Morita, T. & Augustsson, P., 2023.

High-power bulk wave acoustofluidics
Corato, E., Jakobsson, O., Qiu, W., Morita, T. & Augustsson, P., 2023.

Rare cell enrichment by cell self-organization in acoustic fields
Soller, R., Jakobsson, O. & Augustsson, P., 2023, (Unpublished).

The acoustophoretic migration and separation of suspended cells in acoustic impedance gradients
Rezayati Charan, M. & Augustsson, P., 2023, (Unpublished).

Transient behavior and acoustic streaming effects in acoustically packed blood
Soller, R., Jakobsson, O., Qiu, W. & Augustsson, P., 2023.

Determination of the Complex-Valued Elastic Moduli of Polymers by Electrical-Impedance Spectroscopy for Ultrasound Applications
Bodé, W. N., Lickert, F., Augustsson, P. & Bruus, H., 2022 dec., I: Physical Review Applied. 18, 6, 064078.

Electrical impedance spectroscopy for acoustofluidic applications
Bodé, W. N., Lickert, F., Augustsson, P. & Bruus, H., 2022, s. 110-111.

Thermoacoustic streaming in a linear temperature gradient for perpendicular and parallel ultrasound fields
Corato, E., H. Jørgensen, J., Jakobsson, O., Qiu, W., Bruus, H. & Augustsson, P., 2022, s. 190-191.

Thermoacoustic Streaming Induced by Asymmetric Laser Heating
Martens, F., Qiu, W. & Augustsson, P., 2022, s. 128-129.

Towards high-throughput microfluidic compressibility cytometry using gradient acoustic focusing integrated with density centrifugation
Rezayati Charan, M., Andersson, O., Jakobsson, O. & Augustsson, P., 2022.

Fast Microscale Acoustic Streaming Driven by a Temperature-Gradient-Induced Nondissipative Acoustic Body Force
Qiu, W., Joergensen, J., Corato, E., Bruus, H. & Augustsson, P., 2021 aug. 3, I: *Physical Review Letters*. 127, 6, 6 s., 064501.

Effects of a Laser-induced Thermal Gradient on the Acoustic Streaming Field
Martens, F., Qiu, W., Ehn, A. & Augustsson, P., 2021.

Self-organization by acoustic contrast factor in acoustically packed beds of whole blood and in-line removal of red blood cells
Augustsson, P., Soller, R. & Jakobsson, O., 2021.

Particle-size-dependent acoustophoretic motion and depletion of micro- and nano-particles at long timescales
Qiu, W., Bruus, H. & Augustsson, P., 2020 juli 21, I: *Physical Review E*. 102, 1, 11 s., 013108.

Gradient acoustic focusing of sub-micron particles for separation of bacteria from blood lysate
Van Assche, D., Reithuber, E., Qiu, W., Laurell, T., Henriques-Normark, B., Mellroth, P., Ohlsson, P. & Augustsson, P., 2020 feb. 28, I: *Scientific Reports*. 10, 1, 3670.

Charting cell properties through their acoustophoretic migration in a gradient of density and compressibility
Rezayati Charan, M. & Augustsson, P., 2020.

Thermal-gradient-induced fast convection in acoustofluidic devices
Qiu, W., H. Jørgensen, J., Corato, E., Bruus, H. & Augustsson, P., 2020.

Experimental Characterization of Acoustic Streaming in Gradients of Density and Compressibility
Qiu, W., Karlsen, J. T., Bruus, H. & Augustsson, P., 2019 feb. 7, I: *Physical Review Applied*. 11, 2, 11 s., 024018.

Acoustic patterning of concentration fields and its real-time imaging
Qiu, W., Beech, J., Tegenfeldt, J., Bruus, H. & Augustsson, P., 2019, (Unpublished).

Plasma generation and label-free mononuclear cell separation from whole blood by one-step acoustic focusing
Alsved, J., Urbansky, A., Ohlsson, P., Petersson, K., Nielsen, E., Michanek, A. & Augustsson, P., 2019, *23rd International Conference on Miniaturized Systems for Chemistry and Life Sciences, MicroTAS 2019*. Chemical and Biological Microsystems Society, s. 140-141 2 s. (23rd International Conference on Miniaturized Systems for Chemistry and Life Sciences, MicroTAS 2019).

Acoustic impedance matched buffers enable separation of bacteria from blood cells at high cell concentrations
Ohlsson, P., Petersson, K., Augustsson, P. & Laurell, T., 2018 dec. 1, I: *Scientific Reports*. 8, 1, 9156.

Acoustic Streaming and Its Suppression in Inhomogeneous Fluids
Karlsen, J. T., Qiu, W., Augustsson, P. & Bruus, H., 2018 jan. 30, I: *Physical Review Letters*. 120, 5, 6 s., 054501.

Acoustofluidic hematocrit determination
Petersson, K., Jakobsson, O., Ohlsson, P., Augustsson, P., Scheduling, S., Malm, J. & Laurell, T., 2018, I: *Analytica Chimica Acta*. 1000, s. 199-204

ACouWash: A standalone instrument for the washing, separation and enrichment of cells.
Mallinson, J., Linander, O., Magnusson, C., Pirks, K. & Augustsson, P., 2018, *22nd International Conference on Miniaturized Systems for Chemistry and Life Sciences, MicroTAS 2018*. Chemical and Biological Microsystems Society, s. 279-281 3 s. (22nd International Conference on Miniaturized Systems for Chemistry and Life Sciences, MicroTAS 2018; vol. 1).

Suppression of acoustic streaming by the inhomogeneity-induced acoustic body force

Qiu, W., Karlsen, J., Bruus, H. & Augustsson, P., 2018, I: *Proceedings of Meetings on Acoustics*. 34, 1, 045023.

Clinical-Scale Cell-Surface-Marker Independent Acoustic Microfluidic Enrichment of Tumor Cells from Blood

Magnusson, C., Augustsson, P., Lenshof, A., Ceder, Y., Laurell, T. & Lilja, H., 2017 nov. 21, I: *Analytical Chemistry*. 89, 22, s. 11954-11961 8 s.

Shaping acoustofluidic landscapes to profile and separate cells and sub-micron particles

Augustsson, P., 2017 okt. 31, *2017 IEEE International Ultrasonics Symposium, IUS 2017*. IEEE Computer Society, 8091549

Acoustic Force Density Acting on Inhomogeneous Fluids in Acoustic Fields

Karlsen, J. T., Augustsson, P. & Bruus, H., 2016 sep. 9, I: *Physical Review Letters*. 117, 11, s. 114504 6 s.

Iso-acoustic focusing of cells for size-insensitive acousto-mechanical phenotyping

Augustsson, P., Karlsen, J. T., Su, H.-W., Bruus, H. & Voldman, J., 2016 maj 16, I: *Nature Communications*. 7, 11556.

Acoustophoretic manipulation of sub-micron objects enabled by density gradients

Augustsson, P., Karlsen, J. T. & Bruus, H., 2016, *20th International Conference on Miniaturized Systems for Chemistry and Life Sciences, MicroTAS 2016*. Chemical and Biological Microsystems Society, s. 158-159 2 s.

Label-free concentration of viable neurons, hESCs and cancer cells by means of acoustophoresis.

Castro Zalis, M., Reyes, J. F., Augustsson, P., Holmqvist, S., Roybon, L., Laurell, T. & Deierborg, T., 2016, I: *Integrative Biology*. 8, 3, s. 332-340 9 s.

Theory of the acoustic force density acting on inhomogeneous fluids

Karlsen, J. T., Augustsson, P. & Bruus, H., 2016, *20th International Conference on Miniaturized Systems for Chemistry and Life Sciences, MicroTAS 2016*. Chemical and Biological Microsystems Society, s. 721-722 2 s.

Twenty second acoustofluidic whole blood hematocrit assay

Petersson, K., Jakobsson, O., Ohlsson, P., Augustsson, P. & Laurell, T., 2016, *20th International Conference on Miniaturized Systems for Chemistry and Life Sciences, MicroTAS 2016*. Chemical and Biological Microsystems Society, s. 635-636 2 s.

Acoustofluidic, label-free separation and simultaneous concentration of rare tumor cells from white blood cells

Antfolk, M., Magnusson, C., Augustsson, P., Lilja, H. & Laurell, T., 2015, I: *Analytical Chemistry*. 87, 18, s. 9322-9328

Applications in continuous flow acoustophoresis

Lenshof, A., Augustsson, P. & Laurell, T., 2015, *Microscale Acoustophoresis*. Laurell, T. & Lenshof, A. (red.). Royal Society of Chemistry, s. 148-188

A single inlet two-stage acoustophoresis chip enabling tumor cell enrichment from white blood cells

Antfolk, M., Antfolk, C., Lilja, H., Laurell, T. & Augustsson, P., 2015, I: *Lab on a Chip*. 15, 9, s. 2102-2109

Iso-acoustic focusing for size-insensitive cell separation based on acoustic properties

Augustsson, P. & Voldman, J., 2015, *MicroTAS 2015 - 19th International Conference on Miniaturized Systems for Chemistry and Life Sciences*. Chemical and Biological Microsystems Society, s. 14-16 3 s.

Acoustic radiation forces at liquid interfaces impact the performance of acoustophoresis.

Deshmukh, S., Brzozka, Z., Laurell, T. & Augustsson, P., 2014, I: *Lab on a Chip*. 14, 17, s. 3394-3400

Acoustophoresis for label-free separation and concentration of cancer cells

Antfolk, M., Augustsson, P., Magnusson, C., Lilja, H. & Laurell, T., 2014, *18th International Conference on Miniaturized Systems for Chemistry and Life Sciences, MicroTAS 2014*. Chemical and Biological Microsystems Society, s. 2508-2509 (18th International Conference on Miniaturized Systems for Chemistry and Life Sciences, MicroTAS 2014).

Focusing of sub-micrometer particles and bacteria enabled by two-dimensional acoustophoresis.

Antfolk, M., Muller, P. B., Augustsson, P., Bruus, H. & Laurell, T., 2014, *Lab on a Chip*. 14, 15, s. 2791-2799

Improved acoustophoretic circulating tumor cell (CTC) separation for low target cell numbers in clinical volumes

Lenshof, A., Magnusson, C., Augustsson, P., Hafliðadóttir, B., Lilja, H. & Laurell, T., 2014, *18th International Conference on Miniaturized Systems for Chemistry and Life Sciences, MicroTAS 2014*. Chemical and Biological Microsystems Society, s. 594-596 (18th International Conference on Miniaturized Systems for Chemistry and Life Sciences, MicroTAS 2014).

Acoustophoresis separation of bacteria from blood cells for rapid sepsis diagnostics

Ohlsson, P. D., Petersson, K., Augustsson, P. & Laurell, T., 2013, *17th International Conference on Miniaturized Systems for Chemistry and Life Sciences, MicroTAS 2013*. Chemical and Biological Microsystems Society, Vol. 2. s. 1320-1322 3 s.

Microchannel Acoustophoresis does not Impact Survival or Function of Microglia, Leukocytes or Tumor Cells.

Burguillos Garcia, M., Magnusson, C., Nordin, M., Lenshof, A., Augustsson, P., Hansson, M., Elmer, E., Lilja, H., Brundin, P., Laurell, T. & Deierborg, T., 2013, *PLoS ONE*. 8, 5, e64233.

Ultrasound-induced acoustophoretic motion of microparticles in three dimensions

Muller, P. B., Rossi, M., Marin, A. G., Barnkob, R., Augustsson, P., Laurell, T., Kaehler, C. J. & Bruus, H., 2013, *Physical Review E (Statistical, Nonlinear, and Soft Matter Physics)*. 88, 2, 023006.

Acoustic radiation- and streaming-induced microparticle velocities determined by microparticle image velocimetry in an ultrasound symmetry plane

Barnkob, R., Augustsson, P., Laurell, T. & Bruus, H., 2012, *Physical Review E (Statistical, Nonlinear, and Soft Matter Physics)*. 86, 5, 056307.

Acoustofluidics 11: Affinity specific extraction and sample decomplexing using continuous flow acoustophoresis.

Augustsson, P. & Laurell, T., 2012, *Lab on a Chip*. 12, 10, s. 1742-1752

Acoustophoretic microfluidic chip for sequential elution of surface bound molecules from beads or cells

Augustsson, P., Malm, J. & Ekström, S., 2012, *Biomicrofluidics*. 6, 3, 034115.

Label-free somatic cell cytometry in raw milk using acoustophoresis.

Grenvall, C., Folkenberg, J. R., Augustsson, P. & Laurell, T., 2012, *Cytometry Part A*. 81A, 12, s. 1076-1083

Microfluidic, Label-Free Enrichment of Prostate Cancer Cells in Blood Based on Acoustophoresis

Augustsson, P., Magnusson, C., Nordin, M., Lilja, H. & Laurell, T., 2012, *Analytical Chemistry*. 84, 18, s. 7954-7962

Automated and temperature-controlled micro-PIV measurements enabling long-term-stable microchannel acoustophoresis characterization.

Augustsson, P., Barnkob, R., Wereley, S. T., Bruus, H. & Laurell, T., 2011, *Lab on a Chip*. 11, 24, s. 4152-4164

Measuring density and compressibility of white blood cells and prostate cancer cells by microchannel acoustophoresis

Barnkob, R., Augustsson, P., Magnusson, C., Lilja, H., Laurell, T. & Bruus, H., 2011, *15th International Conference on Miniaturized Systems for Chemistry and Life Sciences 2011, MicroTAS 2011*. s. 127-129 (15th International Conference on Miniaturized Systems for Chemistry and Life Sciences 2011, MicroTAS 2011; vol. 1).

On microchannel acoustophoresis - Experimental considerations and life science applications

Augustsson, P., 2011, 72 s.

Cell separation based on acoustophoresis and applications in health care

Lenshof, A., Petersson, F., Augustsson, P., Grenvall, C., Ekström, S., Persson, J., Swärd, A.-M., Åberg, L., Ohlin, M. & Laurell, T., 2010.

Extraction of circulating tumor cells from blood using acoustophoresis

Augustsson, P., Magnusson, C., Grenvall, C., Lilja, H. & Laurell, T., 2010, *14th International Conference on Miniaturized Systems for Chemistry and Life Sciences 2010, MicroTAS 2010*. s. 1592-1594 (14th International Conference on Miniaturized Systems for Chemistry and Life Sciences 2010, MicroTAS 2010; vol. 3).

Measuring the local pressure amplitude in microchannel acoustophoresis

Barnkob, R., Augustsson, P., Laurell, T. & Bruus, H., 2010, *I: Lab on a Chip*. 10, 5, s. 563-570

Buffer medium exchange in continuous cell and particle streams using ultrasonic standing wave focusing

Augustsson, P., Åberg, L. B., Sward-Nilsson, A.-M. K. & Laurell, T., 2009, *I: Microchimica Acta*. 164, 3-4, s. 269-277

Decomplexing biofluids using microchip based acoustophoresis

Augustsson, P., Persson, J., Ekström, S., Ohlin, M. & Laurell, T., 2009, *I: Lab on a Chip*. 9, 6, s. 810-818

Harmonic microchip acoustophoresis: a route to online raw milk sample precondition in protein and lipid content quality control

Grenvall, C., Augustsson, P., Folkenberg, J. R. & Laurell, T., 2009, *I: Analytical Chemistry*. 81, 15, s. 6195-6200

Acoustic microfluidic chip technology to facilitate automation of phage display selection

Persson, J., Augustsson, P., Laurell, T. & Ohlin, M., 2008, *I: The FEBS Journal*. 275, 22, s. 5657-5666

Decomplexing biofluids using microchip based acoustophoresis

Augustsson, P., Persson, J., Ekström, S., Ohlin, M. & Laurell, T., 2008.

On chip affinity selection of antibodies using ultrasonic standing waves

Augustsson, P., Persson, J., Ohlin, M. & Laurell, T., 2008.

Fluorescent Activated Cell Sorter using Ultrasound Standing Waves in Micro Channels

Grenvall, C., Carlsson, M., Augustsson, P., Petersson, F. & Laurell, T., 2007, *Micro Total Analysis Systems 2007. Proceedings of μ TAS 2007. 11th International Conference on Miniaturized Systems for Chemistry and Life Sciences*. Viovy, J.-L., Tabeling, P., Descroix, S. & Malaquin, L. (red.). Chemical and Biological Microsystems Society, Vol. 2. s. 1813-1815 3 s.

On-chip affinity selection of antibodies using ultrasonic standing waves.

Augustsson, P., Persson, J., Ohlin, M. & Laurell, T., 2007, *Micro Total Analysis Systems 2007. Proceedings of μ TAS 2007. 11th International Conference on Miniaturized Systems for Chemistry and Life Sciences*. Viovy, J.-L., Tabeling, P., Descroix, S. & Malaquin, L. (red.). Chemical and Biological Microsystems Society, Vol. 2. s. 1810-1812

Ultrahydrophobic properties of porous silicon for surface based bioanalysis

Ressine, A., Augustsson, P., Marko-Varga, G. & Laurell, T., 2007, *Micro Total Analysis Systems 2007, Proceedings of μ TAS 2007 Conference*. Jean-Louis, V., Tabeling, P., Descroix, S. & Malaquin, L. (red.). Chemical and Biological Microsystems Society, Vol. 2. s. 1046-1047 3 s.

Improved Carrier Medium Exchange Efficiency in Acoustic Standing Wave Particle Washing

Augustsson, P., Petersson, F. & Laurell, T., 2006, *Micro Total Analysis Systems 2006, Proceedings of μ TAS 2006 Conference*. Kitamori, T., Fujita, H. & Hasebe, S. (red.). Society for Chemistry and Micro-Nano Systems, Vol. 1. s. 627-629 3 s.

Separation of escherichia coli bacteria from raw milk using resonant ultrasound in a microfluidic channel
Augustsson, P., Matsuoka, H. & Laurell, T., 2006.

Priser och utmärkelser

Ingvar Carlsson Award 2017

Augustsson, P. (Mottagare), 2017 apr. 10

PhD-thesis of the year 2011 at the Faculty of Engineering at Lund University

Augustsson, P. (Mottagare), 2012 maj 23

The Phabian Award 20013

Augustsson, P. (Mottagare), 2014 feb. 11

Forskningsmedel

Termoakustisk strömning på mikroskalan

Augustsson, P. (PI)

Swedish Research Council: 8 000 000,00 kr

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